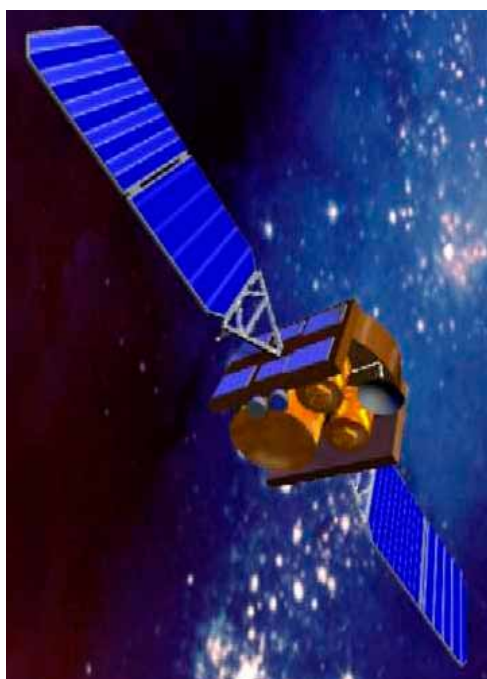




CAN YOU HEAR ME NOW

We Control the High Ground USASMDC/ARSTRAT and Satellite Communications

BY SHARON WATKINS LANG



First launched in 1982, the DSCS III satellites weigh 2,580 pounds and already exceeded their life expectancy of ten years. The rectangular body measures 6 feet X 6 feet X 7 feet and its solar arrays create a 38 - foot span.

Courtesy photo U.S. Army

In June 2010, the U.S. Army Signal Corps marked a significant milestone – its 150th birthday. While only a fraction of the age, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's 53rd Signal Battalion has a long tradition of providing satellite communications support to Soldiers and the nation. The two organizations can trace their parallel history back to the early 1960s and the Initial Defense Satellite Communications System.

The Signal Corps' ties to Space date back to January 1946 and Project Diana, which successfully bounced a signal off the moon proving that sound waves could travel through the atmosphere and Space in both directions. Over the next two decades, the Signal Corps worked to develop a variety of communications satellites. At the same time, however, its role was diminishing.

In 1958, the Advanced Research Projects Agency, a Department of Defense agency which oversaw the research and development projects, tasked the Air Force and the Army to develop an equatorial synchronous satellite communications system. The Air Force would oversee booster and spacecraft development, while the Army was responsible for on-board communications elements and ground-control. In February 1959 the Secretary of Defense transferred additional duties from ARPA to the Army – communications satellite management. In 1960, the DoD combined these three projects into the single Project Advent, which was assigned to the Army. Progress with Project Advent was not productive and it

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WGS is the DoD's highest-capacity satellite communications system. Each WGS satellite can route 2.1 to 3.6 Gbps of data -- providing more than 10 times the communications capacity of the predecessor DSCS III satellite.

Courtesy photo U.S. Army

was terminated in May 1962.

Nevertheless, with developments in both communications and missile technology, the Army realized a need to address the requirements for world-wide satellite and missile ground tracking stations. The first step was the modernization of the Army Command and Administrative Network. After addressing the short-term with support from commercial communications, the Signal Corps began to plan a new Universal Integrated Communications System. Using high-speed computers, the UNICOM would provide greater speed and security for voice, teletype, digital, facsimile, and video communications.

Meanwhile, in May 1960, the DoD established the Defense Communications Agency uniting the three services to operate and manage a new Defense Communications System, which included the ACAN.¹ Described as a worldwide, long-haul system, the DCS would provide secure communications for the President, the Secretary of Defense, the Joint Chiefs of Staff, government agencies and the military services.

Satellite Control and the Signal Corps

In 1962, the Secretary of Defense authorized a new satellite proposal. The Initial Defense Satellite Communications Program called for a series of randomly located medium-altitude, small, non-stabilized satellites. In this case, the Air Force was assigned responsibility for the development of the spacecraft and communications payload and satellite operations. The Army role was

limited initially to the ground communications segment, overseen by the newly developed Army Satellite Communications Agency.

At the same time an Army - wide restructuring brought further changes to the Signal Corps. These ultimately resulted, in March 1964, with the responsibilities of the chief signal officer being incorporated into a newly established major command – the U.S. Army Strategic Communications Command. The STRATCOM missions included management of all long-distance Army communications and the engineering, installation, operation and maintenance of the Army portions of the DCS.²

In 1973, STRATCOM became the Army Communications Command, a move thought to reflect more accurately its broad range of missions. The responsibilities of the ACC ranged from “providing communications within Army posts, camps, and stations to signaling across the continents with satellites.” The ACC also oversaw civil defense communications and management of air traffic control at Army airfields. The following decade saw a tremendous increase in information systems and communications. These developments would have a direct impact upon the ACC. Army Chief of Staff General John Wickham, Jr. ultimately combined five information-related functions (communications, automation, visual information, publications/printing, and records management) into the Information Mission Area. Oversight was assigned to the ACC, renamed the Army Information Systems Command

- **The fourteen satellites of the DSCS III constellation represent as described by the Air Force “the backbone of the U.S. military’s global satellite communication capabilities ... providing nuclear hardened, anti - jam, high data rate, long haul communications to users worldwide.”**



Until recently, the five companies of the 53rd were located at Fort Detrick, Maryland; Fort Meade, Maryland; Landstuhl, Germany; Camp Roberts, California; and Fort Buckner, Japan, the sites of the DSCS Operations Centers.
U.S. Army photos

in May 1984. The role of the IMA was “to provide the commander the information he needed to make accurate decisions and the ability to put them into effect once they were made.”³ Included in this mix was the responsibility for the satellite ground stations.

Defense Satellite Communications System

As technology continued to evolve, operations in Vietnam contributed to increased interest in satellite capabilities. Communications were tenuous as undersea cables did not extend to Southeast Asia and radio communications were unreliable in the tropical atmosphere and high frequencies were easily jammed.⁴ In the early 1960s three SyNCOM satellites were launched into geosynchronous orbit. These experimental satellites, with a one-year design life, were quickly brought into service to address these requirements. A SyNCOM ground-terminal was installed in Vietnam in August 1964 and provided one telephone and one teletype circuit to Hawaii. System improvements soon produced one telephone and 16 message circuits between the combat zone and Hawaii.

Following a program realignment, which eliminated the medium-altitude system in favor of a near-synchronous equatorial satellite configuration, the first seven IDSCP satellites were finally launched in June 1966. Despite problems with the boosters, 26 satellites were placed in orbit by June 1968. These satellites were managed by 36 fixed and mobile ground terminals for the newly renamed Initial

Defense Satellite Communications System. Originally designed for Project Advent and used to support NASA’s SyNCOM, two ground stations, one at Camp Roberts, California, and the other at Fort Dix, New Jersey, began to process IDSCS data soon thereafter. Additional ground terminals were located in Colorado, Hawaii, West Germany, Ethiopia, Guam, Australia, Korea, Okinawa, the Philippines, South Vietnam and Thailand.⁵

Given the situation at the time in Vietnam, the IDSCP was used to establish a link between Vietnam and Washington, D.C. In this experiment, digital data was sent to Hawaii via one satellite and then relayed to Washington on another. Declared operational in 1968, the system was again renamed and became the Defense Satellite Communications System, Phase I. Designed with a single omnidirectional antenna, the DSCS I satellites could carry either two high quality or five tactical quality voice circuits between two ground stations which enabled continuous communications at distances up to 10,000 miles apart.

Although more productive than existing radio and cable communications, these initial satellites had limited channel capacity, user access and coverage. Authorities also expressed concern about command and control vulnerabilities.⁶ The new DSCS II design, comparable to the previous Advent program, would incorporate secure voice and data circuits as well as greater channel capacity and other protective features. In addition, with the two-dish antenna, the ground control could



Casing of the Colors – 14 October 2005 — The 1st SATCON Battalion was redesignated the 53rd Signal Battalion (SATCON). The 53rd Signal Battalion was first activated in 1941 for the duration of World War II. It was reactivated in 1954 and remained on active duty until 1971.
U.S. Army Photo

concentrate the satellite's electronic beams on small areas of the Earth to intensify coverage as needed. The constellation design called for four geosynchronous satellites with two orbiting spares. The phase began in 1964 with the first launch occurring in November 1971 and DSCS II was declared operational. Operational control remained unchanged. Overall system management rested with the DCA, while the Air Force controlled the Space segments and the Army the ground terminals. To support these satellites constructed with four channels with many combinations of bandwidth and antennas, STRATCOM modified the existing 29 IDSCS ground terminals and constructed additional medium and heavy mobile and shipboard terminals. Despite launch failures and other technical difficulties, "by the early 1980s the DSCS II constellation would not only fulfill global, strategic communications requirements through 46 DSCS ground terminals, but would also link the Diplomatic Telecommunications System's 52 terminals and the Ground Mobile Forces' 31 tactical terminals."⁷

The fourteen satellites of the DSCS III constellation represent as described by the Air Force "the backbone of the U.S. military's global satellite communication capabilities ... providing nuclear hardened, anti-jam, high data rate, long haul communications to users worldwide."⁸ The first DSCS III launched in October 1982 equipped with 61 receiving antennas and 19 transmitters could conduct 1,300 simultaneous voice transmissions, and

the technology continued to improve. To support the increased activity, especially in support of the small, transportable, and shipboard terminal users, the later DSCS III satellites "were enhanced to improve their communications capacity by 200 percent, with up to a 700 percent increase in capability to tactical users." The DSCS III have been the linchpin of military communications as evidenced from Operation Desert Storm to the current operations in Afghanistan.

To meet these new requirements, on the ground obsolete ground terminals were replaced and the program began to transition the entire system from analog to digital transmissions. The new system would also permit real time configuration and command control with alternations made at eight net-9 control ground terminals across the globe. Further improvements were planned with the addition of five fixed and six mobile operations centers. A product of this reconfiguration, the DSCS Operations Centers were responsible for two of the three aspects of satellite control – control of the communications payload and control of the communications network.¹⁰ Payload control refers to control of the antenna pointing directions, coverage patterns and configurations for nulling jammers. Network control, which encompasses theater and global telephone, data, message traffic and e-mail service, meanwhile is "the technical management of the DSCS radio frequency spectrum – its power, bandwidth, and frequency allocation." In addition, in coordination with the

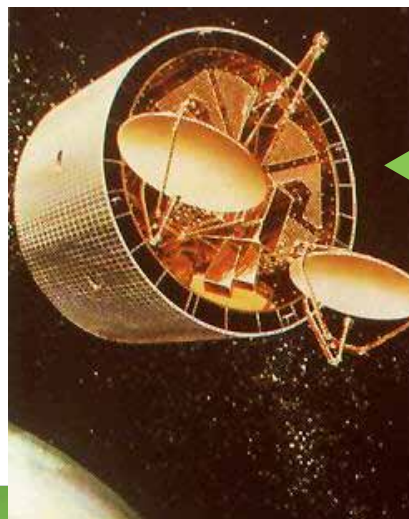
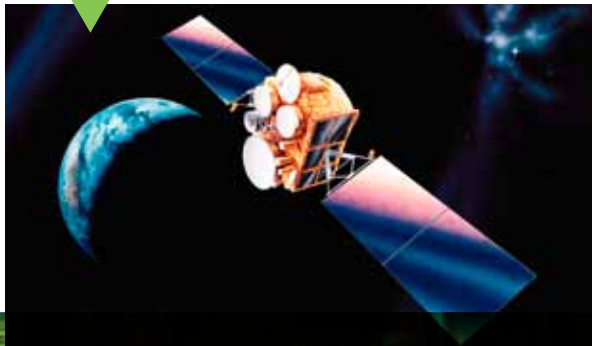


This distinctive unit insignia was first approved for the battalion in January 1942. The motto was added in June 1967



The logo of the 1st SATCON Battalion, the first battalion in Army history with an operational mission directly tied to the control of space systems and capabilities.

The first DSCS satellite was launched in June 1966, from Cape Kennedy, Florida. Launched in groups of eight, a full constellation of 26 of these small 100-pound satellites were put into orbit.



The much larger DSCS-2 had a capacity for 1,300 two-way voice channels or 10 million bits of digital data per second. The cylindrical DSCS-2 measured nine feet in diameter and 13 feet in height and weighed a total of 1,300 pounds, U.S. Army Photos

Footnotes

- ¹ At this time the ACAN is renamed the STARCOM or Strategic Army Communications Network. STARCOM remained under the operational control of the Signal Corps.
- ² As the Army's overseer of the strategic/ long-haul communications system, they provided support to (1) five major sub areas with sub-area units including operation and maintenance of ground satellite communication facilities (2) National Capital Area with Joint Support Command; (3) U.S. Air Defense Command with STRATCOM Air Defense Signal Group; (4) Civil Defense Communication; and (5) Non-defense national communication.
- ³ Brenda Raines, *Getting the Message Through*, p. 399.
- ⁴ *Ibid.*, pp. 360-374.
- ⁵ David Spires, *Beyond Horizons A Half Century of Air Force Space Leadership* (Washington DC: Government Printing Office, 1998), pp. 140-141. The two fixed sites were equipped with AN/ FSC-9 terminals with 60-foot diameter antennas. Mobile terminals included seven AN/TSC-54 terminals with 18-foot antennas, thirteen AN/MSC-46 terminals with 40-foot antennas. The system also included six six-foot ship-based antennas.
- ⁶ *Ibid.*, 142.
- ⁷ *Ibid.*, p. 143.
- ⁸ U.S. Air Force Fact Sheet, "Defense Satellite Communications System, (Undated).
- ⁹ Donald H. Martin, "A History of U.S. Military Satellite Communications Systems," Crosslink. <http://www.aero.org/publications/crosslink/winter2002/01.html>.
- ¹⁰ Keith Bombaugh (CPT), "Satellite control via the DSCSOC", *Army Communicator* (Fall 1985): 17. The Air Force is responsible for the third phase – control of the spacecraft.
- ¹¹ The Regional Space Support Centers would be collocated with the Defense Communications Agency in Washington DC, Wheeler AFB, Hawaii, and Vaihingen, Germany.

Regional Space Support Centers, they arrange satellite access authorizations which "define who and when access to and use of the satellite will occur."

DSCS Transitions to Army Space

The U.S. Army reemphasized its interests in Space in 1986 and established the Army Space Agency, the Army component to U.S. Space Command. 1986, however, would be a pivotal year in the history of Army Space and DSCS. In July, GEN Robert Herres, Commander-in-Chief of the U.S. Space Command, recommended to GEN John Wickham, Chief of Staff of the Army, that the Army take a more active role in Space. GEN Herres particularly noted that DSCS III control should be given to the ASA. In response the ASA assumed operational and maintenance responsibilities for the DSCS Ground Mobile Forces Satellite Communications and MSQ-114 satellite communications control system functions. The Joint Chiefs of Staff Memorandum of Policy 178, dated September 1986, formalized this transfer when it assigned platform control and payload execution to CINCSpace, with O&M control of all seven DSCS Operations Centers to be given to ASA.

In response to this guidance, the U.S. Army Information Systems Command and the ASA developed a plan to transfer the DSCS mission. In January 1987, the DSCS Command and Control concept was outlined. The chain of command as recommended above ran from the Joint Chiefs of Staff through the U.S. Space Command to the Army Space Agency. The Defense Communications Agency, however, retained technical direction at this time. The MILSATCOM Command and Control Concept (MJCS-11-89), released one year later in February 1988, also aligned the DSCS

Operations Control System under CINCSpace to the ASA. The control system at this time included the GMFSC-Regional Space Support Centers, 11 DSCS Operations Centers/MSQ-114, and Contingency DSCS Operational Control System.

Meanwhile change was coming to the ASA. On 7 April 1988, the Army activated the U.S. Army Space Command, as the new Army component to the U.S. Space Command. The general order creating this new organization stated that ARSpace was to provide an Army perspective in planning for Department of Defense Space system support to land forces and strategic defense operations. Later that year, ARSpace's GMFSC managers formally activated the RSSC planning and management cells. These would support the unified and specified commanders with GMF access on the DSCS. Finally, in February 1989, the U.S. Army Information Systems Command and ARSpace completed the memorandum of understanding by which the remainder of the DSCS mission and personnel would transfer to ARSpace. Effective 1 October 1990, the ARSpace assumed control of the GMFSC centers, AN/MSQ-114.¹² The ARSpace would gain 241 positions and an additional 103 support spaces created based upon the increased ARSpace missions.

In August 1992, the Army again reorganized to provide better Space management. Although the ARSpace became a subordinate command in the merger with the U.S. Army Strategic Defense Command, Army Space now had a voice at the three-star level. Among the six missions specifically listed in the General Order creating the U.S. Army Space and Strategic Defense Command was the requirement to command the Defense Satellite Communications System Operations Centers



DSCS III satellites weigh 2,580 pounds and already have exceeded their life expectancy of ten years.
U.S. Army Photo

and manage joint tactical use of these resources.

The Directorate Becomes a Battalion

The demands for tactical Space support grew exponentially following Operation Desert Storm—the first “Space War” – and the concurrent evolution towards a force projection Army. As the 1st Satellite Control Battalion observed in a 1996 article in *Army Communicator*, “You can’t reach home without us!” In five years, the tactical requirements for the DSCS system had grown from under 400 missions in 1990 to over 1,600 in 1995.¹³ This number has only continued to grow with the advent of new technologies, increased deployments and support to other missions, to include drug interdiction programs

Essentially a Table of Distribution and Allowances organization, the ARSpace organization aligned personnel in offices and directorates according to their functions. The group that oversaw the DSCS was assigned to the Directorate of Military Satellite Communications or the MILSATCOM Directorate. Efforts to regularize the structure were realized on 4 April 1995, when ARSpace received approval to form a new battalion – the 1st Satellite Control Battalion. As today, the companies were organized according to location. The Fort Detrick, Maryland, DSCSOC Detachment became A Company; Fort Meade, Maryland, DSCSOC Detachment – B Company; Landstuhl, Germany, DSCOC Detachment – C Company; Camp Roberts, California, DSCSOC Detachment – D Company and recently completed Fort Buckner, Japan, DSCSOC Detachment¹⁴ – E Company. Effective 1 May 1995, the 1st SATCON Battalion became the first battalion

in the history of the Army with an operational mission directly tied to the control of Space systems and capabilities.

The current configuration traces its history to 2002 and the initial approval of a Modified Table of Organization and Equipment structure for Army Space units. The design for the 1st SATCON Battalion was approved in 2003, bringing with it significant changes. Effective 15 October 2005, the 1st SATCON Battalion and its companies were formally inactivated. One day later its mission, functions, personnel etc. were activated as the 53rd Signal Battalion¹⁵ and assigned to the 1st Space Brigade (Provisional). As BG Jeffrey Horne, the USASMDC/ARSTRAT Deputy Commanding General – Operations, noted during the ceremony, “The Army formally recognizes the unit’s operational warfighting mission. Soldiers in this battalion make vital communications happen for our civilian leaders and joint Warfighters.”

Where Do We Go from Here?

The technology continues to move forward and the Wideband Global SATCOM satellites are currently being deployed to replace the DSCS. A single WGS can provide services comparable to ten DSCS satellites. Already three WGS are in orbit. In February, the 53rd celebrated the official opening of the Wideband Satellite Operations Center in Wahiawa, Hawaii. This prototype facility will replace the DSCSOC at Camp Roberts. As the technology continues to evolve, the mission for these Soldiers remains the same. To paraphrase their motto, they control the high ground. ★

Sharon Watkins Lang is the Historian for U.S. Army Space and Missile Defense Command.

¹² The Ground Mobile Forces Satellite Control Centers, AN/MSQ-114 were located in Worms, Germany, Fort Detrick, Maryland, Torii Station, Japan, and Tobyhanna Army Depot, Pennsylvania.

¹³ Another source observes that nearly 90 percent of all military overseas communications travels through space.

¹⁴ The Fort Buckner DSCS OC officially opened on 14 May 1993.

¹⁵ The new 53rd Signal Battalion (SATCON) is authorized the lineage of the original 53rd. The 53rd Signal Battalion was authorized by the Regular Army in October 1927, but activated until June 1941 at Camp Bowie, Texas. During World War II, the 53rd participated in “Operation Torch” in November 1942 and landed in North Africa as part of the II Corps, 5th Army – the first Signal Battalion to enter combat in the European/African Theater of Operations. They served in Algeria and Tunisia before joint the assault landings of the Sicily campaign and moving up the Italian peninsula. At the end of the war, the 53rd was inactivated on 30 September 1944 at Leghorn, Italy having received a Meritorious Unit Citation for its service. Reactivated in September 1954, the 53rd served at various locations to include Fort Hood, Texas and Fort Huachuca, Arizona and Germany during the Berlin Crisis. While two companies were deactivated in 1965, the rest deployed to Vietnam in May 1966. Stationed at Long Binh they served as a communication and combat photo unit and manned a radio relay station. Soldiers from the 53rd helped defend the perimeter during the 1968 and 1969 Tet Offensives and provided radio/teletype teams to any II Field Force unit conducting combat operations. The 53rd remained in Vietnam until 1970 when it redeployed to Fort Lewis, Washington. The unit was then deactivated in June 1971. For their Vietnam service, the unit received three Meritorious Unit Commendation streamers.